



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

GEOGRAPHY

0460/43

Paper 4 Alternative to Coursework

May/June 2015

INSERT

1 hour 30 minutes



READ THESE INSTRUCTIONS FIRST

This Insert contains Photographs A and B, Table 1 and Figs 1 and 4 for Question 1, and Fig. 7 for Question 2.

The Insert is **not** required by the Examiner.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **7** printed pages and **1** blank page.

Photograph A for Question 1



Fig. 1 for Question 1**Extract from student's fieldwork notebook**Water pollution investigation – how we did the tests**Measuring the pH of water**

Use a digital pH meter at each site.

Measuring the oxygen level of water

Collect water from the river in a sample bottle.

Put three drops of blue dye into the river water in the sample bottle.

Store the sample bottle in a dark room.

Record how many days it takes for the dye to disappear and the water to become clear again.

If the water clears quickly it is polluted because there is little oxygen in the water.

If the water takes a long time to clear there is a lot of oxygen in the water and it is unpolluted.

Carrying out the foam test

Collect water from the river in a sample bottle.

Shake the water in the sample bottle for at least one minute.

This will make the water foam up.

Use a stop watch to time how many minutes it takes for the foam to disappear.

The more polluted the water the longer it will take for the foam to disappear.

Table 1 for Question 1

Results of fieldwork

Site	Distance downstream from river source (km)	pH value	Time taken for dye to disappear (number of days)	Time taken for foam to disappear (minutes)
1	5	6.6	9	2
2	11	6.4	7	15
3	18	5.7	6	30
4	21	5.5	3	48
5	25	5.0	2	55

Fig. 4 for Question 1

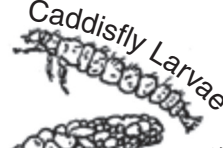













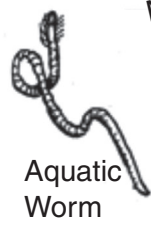



Water pollution investigation using indicator species

Many animals which live on the river bed cannot survive where the river is polluted. The different animal species that are found in the river tell you about the quality of the water. These are called indicator species, which are shown below.

To find these animal species the river bed should be disturbed for 30 seconds by gentle kicking to dislodge the stones (this is called kick-sampling). The animals are washed into a net where they can be caught. This is shown in Photograph B on page 6. The net is then emptied into a tray in order to count and identify the species. The animals are put back in the river after they have been identified. This test is done three times at each investigation site.

The Biotic Index is used to compare the level of pollution at different sites.

Biotic indicator species and biotic scores

Biotic score	9 – 10					
	 Caddisfly Larvae	 Mayfly Nymph	 Stonefly Nymph	 Water Penny	 Riffle Beetle	 Dobsonfly Larva
	Group 1 - These species need good quality water and do not live in polluted water.					
Biotic score	6 – 8					
	 Dragonfly Nymphs	 Damselfly Nymph	 Crayfish	 Fingernail Clam	 Scud	 Sowbug
	Group 2 - These are species which can live in a wide range of water quality conditions.					
Biotic score	1 – 5					
	 Leech	 Midgefly Larva	 Aquatic Worm	 Mosquito Larva	 Blackfly Larva	 Snail
	Group 3 - These species can tolerate pollution and survive in poor quality water.					

Photograph B for Question 1



Fig. 7 for Question 2

Resident Questionnaire

Age group	Under 15	<input type="checkbox"/>	15 - 30	<input type="checkbox"/>
	31 - 60	<input type="checkbox"/>	Over 60	<input type="checkbox"/>
Gender	Male	<input type="checkbox"/>	Female	<input type="checkbox"/>

Question 1

What was the main reason you moved to live here?

Question 2

What are the main benefits of living here?

Question 3

What are the main problems of living here?

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